REMARKS

As the necessary Submission supporting the concurrently filed Request for Continued Examination Transmittal, in the above-identified application, Applicants are further amending the claims in order to further clarify various aspects of the present invention. Specifically, Applicants have amended each of the independent claims 9, 30 and 67 to recite that the multi-component fibers have a size of at most 1 denier per fiber. Note, for example, page 5, lines 16-24 of Applicants' specification.

Moreover, Applicants have set forth the subject matter of previously considered claim 10 as new independent claim 81. Noting the indication by the Examiner in Item 11 on page 4 of the Office Action mailed July 18, 2002, that claim 10 would be allowable if rewritten in independent form, it is respectfully submitted that claim 81 should now be allowed. In light of new independent claim 81, claim 10 has been cancelled without prejudice or disclaimer.

In addition, Applicants are adding new claims 79 and 80 of the application. Claim 79, dependent on claim 9, recites that after the at least partially splitting the first and second segments from each other, to form post-split fibers, the post-split fibers have dpf values less than that of the multi-component fibers, and as low as 0.01 dpf. Similarly, claim 80, dependent on claim 20, recites that after completely splitting the first and second segments from each other, to form post-split fibers, the post-split fibers have dpf values less than that of the multi-component fibers, and as low as 0.01 dpf. Note, for example, the second full paragraph on page 15 of Applicants' specification.

The objection to claim 77, on the basis that the phrase "the thermal

bonding the second polymer material" is grammatically awkward, is noted. Applicants have amended claim 77 to recite that, in the step of thermally bonding the first segments, the second polymer material of the second segments is completely melted. In view of this amendment to claim 77, it is respectfully submitted that the objection to claim 77 is moot.

Applicants respectfully submit that all of the claims now presented for consideration by the Examiner patentably distinguish over the teachings of the reference applied in rejecting claims in the Office Action mailed July 18, 2002, that is the teachings of U.S. Patent No. 4,514,455 to Hwang, under the provisions of 35 U.S.C. §102 and 35 U.S.C. §103.

It is respectfully submitted that the teachings of the applied reference do not disclose, nor would have suggested, fiber-containing material as in the present claims, made from a plurality of multi-component fibers, with each of the multi-component fibers including at least first and second segments, the first segments of the plurality of multi-component fibers having cross-over points with each other, where the first segments cross each other, the second polymer material, of the second segments having been melted and being substantially only at the cross-over points where the first segments cross each other, to act as a binder of the fiber-containing material, and wherein the multi-component fibers have a size of most 1 denier per fiber (dpf). See claim 30.

In addition, it is respectfully submitted that this reference would have neither taught nor would have suggested such fiber-containing material including multi-component fibers having at least the first and second segments, the second segments having been melted and being a binder of

the fiber-containing material, with the first and second segments having been at least partially split from each other prior to melting of the second segments, the fiber-containing material having cross-over points of the first segments with each other, with the second polymer material, of the second segments, being substantially only at the cross-over points where the first segments cross each other, the multi-component fibers having a size of at most 1 denier per fiber (dpf). See claim 9.

Furthermore, it is respectfully submitted that the reference as applied by the Examiner would have neither taught nor would have suggested such fiber-containing material as in the present claims, made by the process including collecting a plurality of multi-component fibers having first and second segments, the multi-component fibers having a size of at most 1 denier per fiber (dpf), splitting the second segments at least partially from the first segments, and, after the splitting, thermally bonding the first segments by melting the second polymer material of the second segments, the second polymer material of the second segments being melted so as encapsulate the first segments at cross-over points of the first segments, with the first segments crossing each other at the cross-over points, and wherein after the thermal bonding the second polymer material of the second segments is substantially only at the cross-over points of the first segments where the first segments cross each other. Note claim 67.

Moreover, it is respectfully submitted that this applied reference would have neither taught nor would have suggested the additional features of the present invention as in the dependent claims being considered on the merits in the above-identified application, including (but not limited to) wherein the

post-split fibers (the resulting product after at least partially splitting- claim 79, or completely splitting - claim 80 the first and second segments from each other) have dpf values less than that of the multi-component fibers and as low as 0.01 dpf; and/or wherein the multi-component fibers are microfibers (see claim 15); and/or weight of the formed material (note claim 12); and/or wherein the second segments have been completely melted in forming the material (note, for example, claim 13); and/or wherein the second polymer material forming the second segments, is the sole binder of the fiber-containing material (note claim 15); and/or wherein the second segments have been completely split from the first segments (see claim 20), or have been only partially split from the first segments (see claim 18).

The invention, as being considered on the merits in the present application, is directed to fiber-containing materials (for example, fibrous materials, such as woven fabrics, knit fabrics, yarns, webs and nonwoven fabrics). It has long been desired to provide bonded fibrous materials, including non-woven materials, having increased strength and increased softness. According to various techniques for forming such bonded fibrous materials, a binder fiber is utilized having an adhesive sheath, which is softened so as to bind fibers thereto after the softened adhesive has hardened. Note, for example, page 1, line 19 to page 2, line 14, of Applicant's specification. In this structure, there is excessive adhesive, and there is undesirable bonding of more than just the cross-over points (that is, potential bonding sites) of the structure.

It has also been known to use standard size binder fibers which are melted, forming melted adhesive, to provide the bonded structure. However,

an excessive amount of binder at one spot occurs, as described in the paragraph bridging pages 2 and 3 of Applicants' specification.

Fiber structures composed wholly or in part of completely or partially split multi-component fibers were known, and it was known to bond the fibers at the points of intersection through application of heat. Note the last full paragraph on page 3, and the paragraph bridging pages 3 and 4, of the present specification.

However, in prior techniques, with improved (increased) strength there occurred decreased softness, and with increased softness there occurred decreased strength. Thus, it was still desired to provide fibrous material having both improved strength and softness, with less wasted binder material.

It has also been desired to provide fiber-containing material having a higher surface area and smaller pore size, and having additional features as discussed previously. Such structure can be achieved, for example, in using fibers having relatively small denier size (for example, having a denier of one or less). It has been difficult to form fiber-containing material with fibers of such a small size, since it is very expensive to make the smaller fibers, for example, because of the cost of the die having very small holes for extrusion; and also due to small diameter fibers being very fragile, for example, when being carded in a web-forming process or being extruded in the fiber-forming process.

Against this background, Applicants provide fiber-containing material having the desired improvement in both strength and softness simultaneously, and wherein the fiber-containing material can have a high surface area and

small pore size. Applicants can utilize small fibers in the fiber containing material.

Applicants have found that utilizing multi-component fibers including at least first and second segments respectively of first and second polymer materials of different melt temperatures, especially with the segments being at least partially split from each other, and with the lower melt temperature polymer material (that is, polymer material of the second segments) being melted to provide a binder of the fiber-containing material, the melted second polymer material, of the second segments, being substantially only at the cross-over points of the first segments of first polymer material of higher melt temperature, e.g., encapsulating the cross-over points, objects according to the present invention are achieved. That is, a fiber-containing material of high strength and of good softness is achieved. With the binding polymer material, of the second segments, being melted and being substantially only at the cross-over points of the first segments (especially, in encapsulating the cross-over points), improved strength is achieved with use of less binder. Furthermore, with the melted second polymer material substantially only at the cross-over points where the first segments cross each other, there is less binder material waste; and, moreover, softness is improved. In addition, because more bonding sites are formed, e.g., at the cross-over points of the first segments, a more even appearance is achieved. Note, in particular, the sole full paragraph on page 24, and the paragraph bridging pages 24 and 25 of Applicants' specification. Note, also the paragraph bridging pages 8 and 9 of Applicants' specification.

In addition, the present invention uses the multi-component fibers, which are subsequently split and thereafter wherein the second segments are melted and become a binder of the fiber-containing material. Through use of the multi-component fibers, during a large part of the processing in forming the fiber-containing material relatively large-size fibers, as compared with the size of the segments, are processed, so that the dies for extrusion can be relatively large (and thus relatively inexpensive), while the multi-component fibers formed are relatively sturdy and sufficiently strong for the fiber-forming and material-forming processes. Thus, a product with smaller denier fibers (i.e., the segments) can be formed, easily and relatively inexpensively.

Hwang discloses a composite nonwoven fabric particularly suited for use as an apparel insulating interliner, which includes a batt of staple polyester fibers that is attached to a nonwoven sheet of continuous polyester filaments. See column 1, lines 10-13. Note also column 2, lines 54-61. This patent discloses that in addition to light and heavy staple fibers, the batt optionally may include as much as 15% or more of binder fibers; and that upon heat treatment at temperature above their melting point, the binder fibers loose their identity as fibers by coalescing on the surfaces or at the cross-overs of the other fibers to bond the batt. This patent discloses that the bonding, though not necessary, enhances the dimensional stability of the staple fiber batt. See column 4, lines 5-12. Note also that this patent requires attachment of the batt to a nonwoven sheet of polyester continuous filaments in a particular way (see column 3, lines 33-37); and specifies that the binder preferably is activated by heating the batt after it has been stitched to the non-

woven sheet, although the batt may be bonded at an earlier stage. See column 5, lines 27-31.

Note that the fibers used in forming the fabrics of Hwang are relatively large. For example, in Example 1, the light fibers are fibers of 1.35 dpf and the heavy fibers are solid fibers of 5.5 dpf. It is respectfully submitted that one of ordinary skill in the art would not have used small fibers in Hwang, due to expense in forming the small fibers and fragility of the small fibers in the processing. It is respectfully submitted that Hwang would have neither taught nor would have suggested the present invention, including the fiber-containing material made from multi-component fibers having the recited size (the split segments having a smaller size), and advantages thereof, including higher surface area and smaller pore sizes of the fabric.

Furthermore, Applicants respectfully traverse the contention by the Examiner that Hwang discloses binder material as in the present invention. The Examiner has pointed to no basis within the disclosure of Hwang itself, that Hwang has structure including the binder material located substantially only at the cross-over points.

The contention by the Examiner that since, in Hwang, the binder material is given time to melt and flow, this would produce Applicants' claimed structure, is respectfully traversed. The Examiner has not established that Hwang, in all instances, including in the examples, has fibers melt sufficiently to produce the claimed product. It is emphasized that the burden is on the Examiner to satisfied anticipation. It is respectfully submitted that the Examiner has not established the burden.

The dismissal of the Examiner of the step of splitting the multi-component fibers prior to melting, as a method limitation which is not given any patentable weight, is respectfully traversed. Where the processing provides a different product than that in the prior art, the processing must be given weight in determining patentability. See In re Luck, 177 USPQ 523, 525 (CCPA 1973). Under the present circumstances, it is respectfully submitted that Applicants have provided clear reasoning as to a more intimate mixture of the first and second segments achieved according to the present invention, including splitting the multi-component fibers prior to melting, achieving, after melting, excellent location of the binder, as in the present claims. Moreover, utilizing the multi-component fibers, particularly of a size according to the present invention, advantages are achieved as compared to the prior art, in that by splitting the multi-component fibers after depositing the fibers and prior to melting, lower denier fibers, (i.e., the segments of the multi-component fibers) can be provided, and a product having a higher surface area and a smaller pore size can be achieved. In view thereof, and particularly in view of the difference in structure achieved according to the present invention, it is respectfully submitted that the Examiner errs in failing to give any weight to the structure formed by the splitting the multi-component fibers prior to melting.

Reference by the Examiner to the patent documents to Marshall (4,083,913), Peoples (4,568,581) and Geary et al. (EP 555,345), in the paragraph bridging pages 6 and 7 of the Office Action mailed July 18, 2002, is noted. Such reference to these patent documents, in an anticipation rejection under 35 U.S.C. §102, is inappropriate.

In addition, it is noted that these three patent documents are not listed in the formal statement of the rejection. Moreover, combinability of the teachings of these references with the teachings of Hwang, which is required under 35 U.S.C. §103, has not been provided by the Examiner. Clearly, reliance by the Examiner on these references, without making these references a formal part of the rejection, is improper. See In re Hoch, 166 USPQ 406, 407 n.3 (CCPA 1970).

The contention by the Examiner that the heated binder material would not only inherently bead up upon heating but will also inherently be substantially located only at the cross-over points of the fibers in the nonwoven material, based upon teachings of Marshall, Peoples and Geary, et al., is noted. It is respectfully submitted that various factors, including, for example, temperature of heating and time of heating, would influence the final product. Again, it is respectfully submitted that based upon the teaching of Hwang as a whole, the Examiner has not established inherency with respect to location of the binder material.

In any event, it is again noted that by the processing according to the present invention, using the multi-component fibers which are at least partially split prior to melting, fibers having a smaller denier after splitting can be processed. In view thereof, and noting recitation as to fiber size, in the present claims, it is respectfully submitted that Hwang would have neither taught nor would have suggested the present invention.

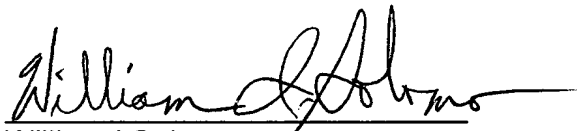
In view of the foregoing comments and amendments, entry of the present amendments and granting of the enclosed Request for Continued

Examination and allowance of all claims being considered on the merits in the application, are respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The changes are shown on the attachment captioned **"VERSION WITH MARKINGS TO SHOW CHANGES MADE."**

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (Case No. 709.36924X00) and please credit any excess fees to such deposit account.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please cancel claim 10 without prejudice or disclaimer, and amend the claims remaining in the application as follows:

9. (Thrice Amended) Fiber-containing material made from a plurality of multi-component fibers, each multi-component fiber including at least first and second segments, the first and second segments being made respectively of a first polymer material and a second polymer material, the first polymer material having a higher melt temperature than that of the second polymer material, the second segments having been melted and being a binder of the fiber-containing material, the first and second segments having been at least partially split from each other prior to melting of the second segments, wherein the fiber-containing material has cross-over points of the first segments with each other, where the first segments cross each other, [and] wherein the second polymer material, of the second segments, is substantially only at the cross-over points where the first segments cross each other, and wherein the multi-component fibers have a size of at most/denier per fiber (dpf).

30. (Thrice Amended) Fiber-containing material made from a plurality of multi-component fibers, each multi-component fiber including at least first and second segments, the first and second segments being made respectively of a first polymer material and a second polymer material, the first polymer material having a higher melt temperature than that of the second

polymer material, the first segments of the plurality of multi-component fibers having cross-over points with each other, where the first segments cross each other, [and] wherein second polymer material, of the second segments, has been melted and is substantially only at the cross-over points where the first segments cross each other, to act as a binder of the fiber-containing material, and wherein the multi-component fibers have a size of at most 1 denier per fiber (dpf).

67. (Twice Amended) Fiber-containing material, made by a process comprising the steps of:

collecting a plurality of multi-component fibers, the multi-component fibers having at least first segments and second segments respectively made of first and second polymer materials, the first polymer material having a higher melt temperature than that of the second polymer material, the multi-component fibers having a size of at most 1 denier per fiber (dpf);

splitting the second segments at least partially from the first segments; and

after said splitting, thermally bonding the first segments, to form the fiber-containing material, by melting the second polymer material of the second segments,

wherein in the collecting step, the plurality of multi-component fibers form cross-over points with each other, and in the thermal bonding step the second polymer material of the second segments is melted so as to encapsulate the first segments at cross-over points of the first segments, the

first segments crossing each other at the cross-over points of the first segments after the thermal bonding, and

wherein after the thermal bonding the second polymer material of the second segments is substantially only at the cross-over points of the first segments, where the first segments cross each other.

77. (Amended) Fiber-containing material according to claim 67, wherein, in the step of [thermal] thermally bonding the first segments, the second polymer material of the second segments is completed melted.